

CLAIMS:

1. An aluminum nitride sintered body comprising crystal grains of an average grain size (D_{50}) of 0.1 to 2.5 μm , and having a pore area ratio of not larger than 1×10^{-7} , a pore density of not larger than 0.05 pores/ mm^2 of pores having diameters of not smaller than 1 μm , and a Vickers' hardness in a range of 14 to 17 GPa.
2. An aluminum nitride sintered body according to claim 1, wherein said crystal grains have such a grain size distribution that a difference between the cumulative 90% grain size (D_{90}) and the cumulative 10% grain size (D_{10}) is not larger than 1.5 μm .
3. A method of producing an aluminum nitride sintered body by sintering an aluminum nitride powder by feeding a pulse current, wherein the pulse current is so fed while pressing the aluminum nitride powder that the temperature that is reached is higher than 1500°C but is not higher than 1800°C.
4. A method of producing an aluminum nitride sintered body according to claim 3, wherein the pressure for pressing the aluminum nitride powder is not smaller than 0.3 tf/ cm^2 but is smaller than 0.6 tf/ cm^2 .
5. A method of producing an aluminum nitride sintered body according to claim 3, wherein a rate of elevating the temperature to a temperature that is reached is 30 to 150°C/min.
6. A method of producing an aluminum nitride sintered body according to claim 3, wherein an average crystal grain size of the aluminum nitride powder is from 0.05 to 5 μm .
7. A method of producing an aluminum nitride sintered body according to claim 3, wherein the

sintering is conducted in vacuum or in an inert gas atmosphere.

5 8. A method of producing an aluminum nitride sintered body according to claim 3, wherein after the feeding of the pulse current has been discontinued, the obtained sintered body is heat-treated at a temperature of 1550 to 1800°C.

10 9. A method of producing an aluminum nitride sintered body according to claim 3, wherein the aluminum nitride powder is blended with a sintering aid in an amount of 0.1 to 10 parts by weight per 100 parts by weight of the aluminum nitride powder.

15 10. A substrate obtained by mirror polishing the aluminum nitride sintered body of claim 1.

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